1885MNRAS..46...23M

Notes on the Total Solar Eclipse of September 9, 1885, *viewed at the Terrace, Wellington, New Zealand.* By Charles Rous Marten, F.R.G.S., F.R.Met.Soc.

(*Communicated by Prof. Adams.*)

The following are simply what they profess to be—"Notes"—and do not claim to be in any sense complete or exhaustive observations. Such elaborate and extensive preparations had been made for the observation of the eclipse by the regular official authorities, that I assumed that these would furnish all the results ordinarily desired, and accordingly I devoted my own attention rather to certain details respecting which I felt personally interested. Finding, however, that the official observations were in a large degree marred by unfavourable weather, I send, for what they may be worth, such general notes as I made, having been fortunate in enjoying a perfect view of the phenomenon. The particular details to which, as mentioned above, I addressed my especial attention, I have not time now to deal with, but I may do so at a future date.

The day of the eclipse was ushered in by most unpromising conditions of weather—a strong southerly gale blew from seaward, bringing dense masses of cloud and a very low temperature.

Westward the sky was fairly clear, but eastward the cloud canopy was very heavy. The Sun was not once visible until 7.4 A.M., but from that time forward it was never seriously obstructed by clouds. My position was in my front garden, at an elevation of about 100 feet above the level of the bay; my apparatus was of the simplest kind. An exceptionally good binocular field-glass, darkened glasses for use before and after totality, an excellent chronograph, self-registering thermometers by Casella.

At 7.4 A.M. the solar disc, then partially eclipsed, showed itself through a rift in the clouds. The clouds then cleared off, excepting on the horizon, and an absolutely perfect view was obtained thenceforward to the conclusion. No noteworthy diminution of light could be discerned by the mere vision until fully two-thirds of the solar disc had become covered, but from the time the first decrease in illumination was noticeable, the light faded very swiftly. The sunlight in New Zealand is usually exceedingly brilliant, far more so than in England, and quite as vivid as in most tropical countries. I observed the difference on the one hand, and the similarity on the other, in my recent visits to England and Brazil.

As totality approached, the effects of light and shade on terrestrial objects were very weird and striking. I may add that they differed materially in intensity from those I have observed in two former eclipses. There was a curious mixture of purple and green and bronze in the hues pervading the hills, while the blue sky deepened into iron grey and then to a leaden

1885MNRAS..46...23M

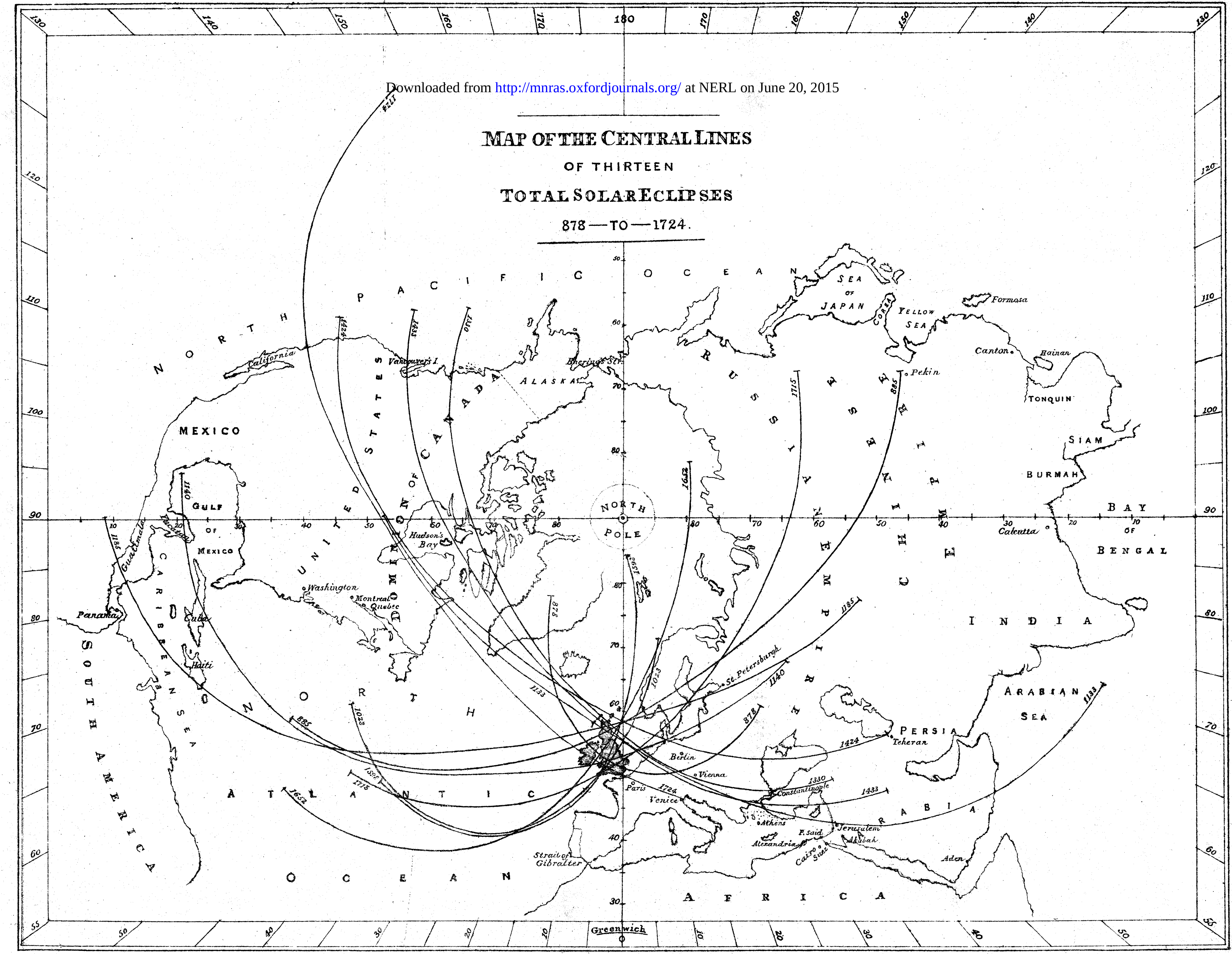
tint, the waters of the bay looking like ink. The white and light coloured had a strangely wan, pallid look. I mention these points because I attribute the effects to the same cause that produces the fore-glow and after-glow which have preceded sunrise and followed sunset so frequently during the last two years. I shall have occasion to return to this matter.

Shortly before totality, I should say fifteen to twenty seconds—but I was unable to take the time with precision, being otherwise occupied—the entire disc of the Moon became suddenly visible against the white background of the solar corona, and then the approach of the dark shadow of totality could be plainly seen as it moved swiftly across the landscape. An instant before totality the solar light was concentrated into one intensely brilliant point, strongly resembling the light of the electric arc, and then came the complete obscuration. The darkness was not so great as I had anticipated, being about equal to that of a moonlight night in the Moon's first quarter. I attribute this partly to the amount of light reflected from the bulky masses of cumulous cloud which hung around the horizon, and partly to the illuminating influence of the "glow" which surrounded the eclipsed Sun like a huge rosy-mauve halo. A watch face could be easily read at the darkest period.

The corona presented a splendid spectacle surrounding the jet-black lunar disc. It was deeply serrated, or rather "rayed," pearly white with rays streaming out to a distance of fully two lunar diameters, and in the case of one on the upper left quadrant, more. Another long ray proceeded from the lower right quadrant, and there was an apparent equatorial protuberance. The whole appearance of the corona almost exactly resembled that of the Aurora Australis as I have often observed it at my former observatory in the extreme south of New Zealand, then the most southern observatory in the world. There was also a seeming unsteadiness at times noticeable in the auroral light, and a distinctly varying degree of luminosity in the coronal rays, while near the lunar edge there was, on the advancing side just after totality, and on the retreating side just before the reappearance of the Sun, a yellowish tinge, the rayed structure was very marked at the moment of absolute centrality.

The red prominences were visible in remarkable brilliancy to a far greater extent than I have ever seen described in accounts of other total eclipses. To describe their extent very roughly, I should say that, taking a clock face and its minutes as the gauge, one serrated series of prominences on the upper limb of the Sun, resembling a mountain range of red flames, extended from $0^h\ 54^m$ to $0^h\ 3^m$ in full brilliancy, and that red traces extended on the left hand to $0^h\ 52^m$, and on the right to $0^h\ 4^m$. Other large but narrow red prominences were at $0^h\ 39^m$ and at $0^h\ 20^m$. I fancied I saw a fourth momentarily at $0^h\ 30^m$. These "times" will be distinctly understood to indicate merely the *positions*—

MAP OF THE CENTRAL LINES
OF THIRTEEN
TOTAL SOLAR ECLIPSES
878—TO—1724.



Spottiswoode & Co. Lith. London.

1885MNRAS..46...23M

1885MNRAS..46...23M

regarding the Sun's disc as a clock-face—and as I have explained at the outset, I cannot pretend to any great exactness in fixing them, as much of my attention was otherwise engaged. The prominences were very rich in colour and seemed, like the corona, to vary in intensity. They also seemed to vary in depth of hue, ranging from pink or rose to scarlet and almost to crimson. They had a markedly transparent appearance, like a light shining through coloured glass. I found I could see them quite plainly with my naked eye, after once having ascertained their position by means of the glass.

The "glow" seen before sunrise and after sunset now appeared in great beauty and richness of tint, surrounding the eclipsed Sun. The pink, rose, and mauve hues, the latter deepening to violet, and then fading to lavender, were very fine. The glow had extended round the dark body of the Moon as it advanced over the Sun, and similarly it preceded the Moon as it passed off the Sun's face. None could be seen on the uneclipsed side of the Sun. The exact time, carefully taken by chronograph, which elapsed between the final disappearance of the last sparkle of solar light on the right hand and the reappearance of the first sparkle on the left was 1 min. 32·9 secs.

The temperature, which was 49°·1 at sunrise, gradually fell during the eclipse, and finally receded to 43°·6, a fall of 5°·5. This was a smaller difference than I had expected. I imagine the smallness was due to the strong gale blowing, which must have tended to equalise temperatures. I fancy also that the disturbed state of the atmosphere may possibly be responsible for the seeming variation and unsteadiness of the coronal light and red flames.

Jupiter was very clearly visible during totality, also several stars, but the time was too short to allow of my recording particulars in addition to my other notes.

I forward these rough notes, *quantum valeant*, and can only express my regret that I had not, in anticipation of possible failure in the case of the official observations, made arrangements for observing the eclipse fully, and having telescopic, spectroscopic, and photographic records taken. However, if my very crude notes should prove of any service I shall be more than repaid my trouble in writing them.

The Terrace, Wellington:
1885, *September* 9.

Total Solar Eclipses A.D. 878 *to* 1724. By Joseph Maguire.

In the May number of the *Monthly Notices* parts of the central and limiting lines of these thirteen eclipses are shown on a map of the British Isles.

The map sent herewith, and to which this communication